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Aerosol inhalation device.

An aerosol inhalation device (1) suitable for use in association with a pressurised medicament container (3) having a valve stem (4) has a spray head (5) adapted to receive the valve stem (4). The spray head (5) has an outlet orifice which is provided with a spout (12). The device is especially useful in the administration of hygroscopic medicaments, for example sodium cromoglycate or nedocromil sodium.

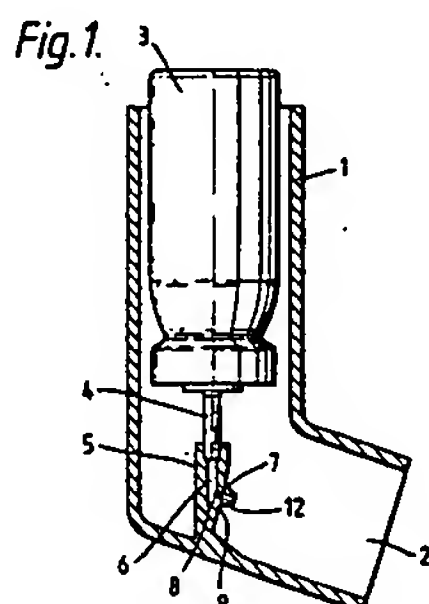


Fig. 1.

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This invention relates to improvements in aerosol devices, more particularly to those for the dispensing of medicaments for inhalation.

The use of aerosol inhalation devices for the administration by inhalation of medicaments in the form of powder aerosols is well known. Such devices generally comprise a housing which receives a canister of pressurised medicament. The canister is provided with a dispensing metering valve including a metering chamber and a hollow valve stem which locates in a spray head within the housing.

Medicament is discharged by moving the canister relative to the valve stem. This changes the dispensing metering valve from an inoperative state in which the metering chamber is isolated from the atmosphere to an operative state in which the metering chamber communicates with the atmosphere via the valve stem and an outlet orifice provided in the spray head. Thus, in the operative state medicament can pass from the chamber through the valve stem, the spray head and the outlet orifice into the housing from where it can be inhaled by a user via a mouthpiece formed in the housing.

A problem which can occur with devices of this type is blockage of the outlet orifice. Also, medicament may build up around the outlet orifice and form a plug which may subsequently be dislodged and inhaled by the user.

We have now surprisingly found that these problems can be eliminated or substantially mitigated by providing the outlet orifice with a spout.

Thus, according to the present invention there is provided an aerosol inhalation device suitable for use in association with a pressurised medicament container having a valve stem, the device comprising a spray head adapted to receive the valve stem and having an outlet orifice, characterised in that the outlet orifice is provided with a spout.

We prefer the spout to be generally frusto-conical in shape. We particularly prefer the spout to be frusto-conical and the curved outer surface of such a spout to be concave.

We prefer the spout to be less than 10mm and more preferably less than 5mm in length, for example 2mm. The ratio of the length of the outlet orifice to the length of the spout is preferably less than 2:1.

The spray head includes an internal cavity which is open at one end to receive the valve stem and closed at the other end. The cavity may extend beyond the outlet orifice.

We prefer the outlet orifice to be of uniform cross section throughout its length. We further prefer the outlet orifice to be circular in cross section.

The device of the present invention is used in conjunction with a canister of pressurised medicament. Thus, the present invention further provides an aerosol inhalation device comprising a pressurised medicament container having a valve stem, a spray head adapted to receive the valve stem and having an outlet orifice, characterised in that the outlet orifice is provided with a spout.

We have found that the problem of blockage is particularly marked when the medicament is hygroscopic. Thus, the spouted inhalation devices of the present invention are particularly useful for administering hygroscopic medicaments.

By "hygroscopic medicament" we mean a medicament which takes up significant amounts of water when in a moist atmosphere, for example one which at 90% relative humidity (being approximately a lower value for the relative humidity found in human breath) takes up more than 8% of its own weight of water. Examples of such medicaments include sodium cromoglycate and nedocromil sodium.

The aerosol inhalation devices of the invention have the advantages that they do not become blocked or block less frequently, so that a canister of medicament can be exhausted without the danger of the device being discarded prematurely because the patient mistakenly believes that the canister is empty or because it cannot readily be unblocked; there is a greatly reduced risk of plugs of medicament forming in the devices which are subsequently inhaled by the patient - such inhalation may lead to over-dosing or a coughing spasm which is especially dangerous for patients who have breathing difficulties and who are most likely to be using aerosol inhalation devices; the devices are more hygienic because there are fewer or no medicament secretion surfaces which bacteria may colonise; and they need to be cleaned less frequently - cleaning being a difficult task for patient who have unsteady hands.

A preferred embodiment of a device according to the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a side view in partial section of an aerosol inhalation device according to the invention fitted with a pressurised medicament container;

Figure 2 is an expanded view of the spray-head of the device shown in Figure 1 (also here in cross-section) and;

Figure 3 is a view of the spray-head shown in Figure 2 along the line III-III.

Referring first to Figure 1, an aerosol inhalation device comprises a generally cylindrical housing 1

having a mouthpiece 2. The housing 1 receives a container 3 of pressurised medicament, the container being provided at one end with a metering valve including a valve stem 4. The valve stem 4 is seated in a spray head 5. The spray head 5 includes an internal cavity 6 provided with an outlet orifice 7. The internal cavity 6 has a lower portion 8 which extends below the outlet orifice 7.

As can be seen more clearly from Figure 2, the outlet orifice 7 passes through a spout 12 which has a generally frusto-conical shape with a concave outer wall. The spout 12 rises out of a flat front surface 9 of the spray head 5, the flat surface being at an angle such that the spout 12 is directed towards the mouthpiece 2.

To use the device, a patient inhales at the mouthpiece 2 while simultaneously urging the medicament container 3 towards the spray head 5. The relative motion of the container 3 and the valve stem 4 causes the metering valve to open and medicament to be discharged into the valve stem 4. The medicament then passes through the internal cavity 6 of the spray head, and finally through the outlet orifice 7 after which it is inhaled by the patient through the mouthpiece 2.

Claims

1. An aerosol inhalation device suitable for use in association with a pressurised medicament container having a valve stem, the device comprising a spray head adapted to receive the valve stem and having an outlet orifice, characterised in that the outlet orifice is provided with a spout.
2. An aerosol inhalation device according to claim 1, wherein the spout is generally frusto-conical in shape.
3. An aerosol inhalation device according to claim 2, wherein the curved outer surface of the spout is concave.
4. An aerosol inhalation device according to any one of the preceding claims, wherein the spout is less than 10mm in length.
5. An aerosol inhalation device according to any one of the preceding claims, wherein the spout is less than 5mm in length.
6. An aerosol inhalation device according to any one of the preceding claims, wherein the spray head includes an internal cavity which is open at one end to receive the valve stem and closed at the other end, the cavity extending beyond the outlet orifice.
7. An aerosol inhalation device according to any one of the preceding claims, wherein the outlet orifice is of uniform cross section throughout its length.
8. An aerosol inhalation device comprising a

pressurised medicament container having a valve stem, a spray head adapted to receive the valve stem and having an outlet orifice, characterised in that the outlet orifice is provided with a spout.

9. An aerosol inhalation device according to claim 8, wherein the medicament is hygroscopic.

10. An aerosol inhalation device according to claim 9, wherein the medicament is sodium cromoglycate or nedocromil sodium.

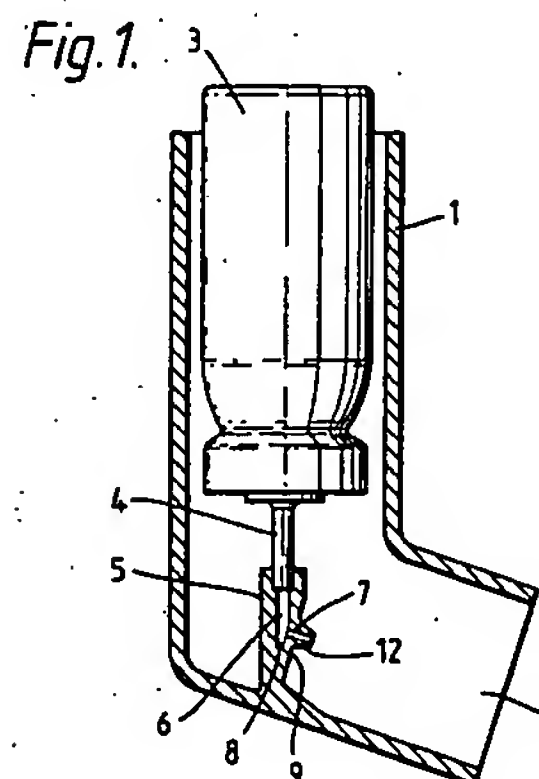
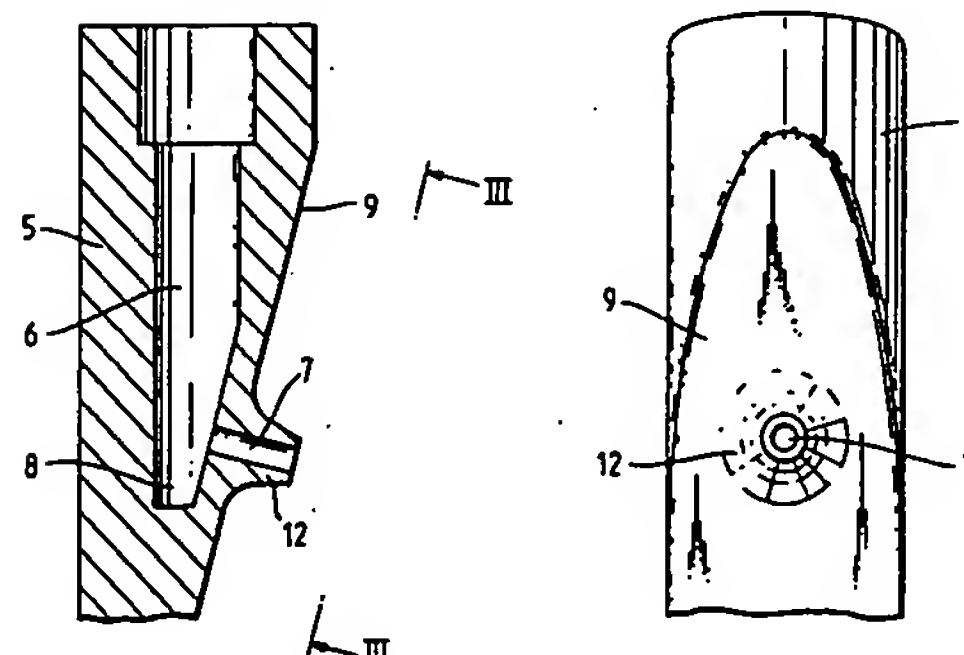


Fig. 2.

Fig. 3.





European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number

EP 89 31 0314

## DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 8)
X	FR-A-2 603 809 (GLAXO GROUP) * Page 3, line 24 - page 7, line 27; figures 1-3 *	1-8	A 61 M 15/00 B 65 D 83/14
Y	---	9,10	
Y	EP-A-0 089 070 (FISONS) * Page 1, lines 2-4; page 5, line 23 - page 6, line 7 *	9,10	
X	EP-A-0 132 352 (GLAXO GROUP) * Page 3, lines 1-24; figures 1,6,8 *	1	
X	US-A-3 913 842 (SINGER) * Column 1, lines 1-6; column 3, lines 3-14; column 3, lines 30-49; figure 2 *	1-3,6-8	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 8)
			A 61 M B 65 D
The present search report has been drawn up for all claims			
Name of inventor		Date of completion of the search	Searcher
THE HAGUE		24-01-1990	SCHOENLEBEN J.E.F.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure F : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published up, or after the filing date D : document cited in the application L : document cited for other reasons A : number of the same patent family, corresponding document	